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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
09 809,606	03/15/2001	Xiaoming Jin	LDC-MASK	4987

7590 07/16/2002

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EXAMINER

MCLENDON, SANZA L

ART UNIT	PAPER NUMBER
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1711

DATE MAILED: 07/16/2002

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/809,606

Applicant(s)

JIN ET AL.

Examiner

Sanza L McClendon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 15 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 15 March 2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(?) (a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1-7 and 10-14, 19, 21, and 24-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Boutoussov et al (WO 00/67408).

Boutoussov et al teaches optical sources and methods using said source. Said optical source can be in the form of a medical apparatus (hand held curing device) that includes an array of optical sources for curing dental composites with controlled shrinkage and reduced chances of secondary caries. Said sources are individually addressable to produce at least two different output intensity patterns. One method according to the invention involves filing a tooth cavity with a curable dental composite material, providing a first optical beam having an intensity distribution in a cross section that concentrates energy at the periphery of the cross section, using the first optical beam to cure the portion of the composite material that is contacting the tooth tissue at the sides without curing the composite material that is interior of the cavity, providing a second optical beam having an intensity distribution in cross section that does not concentrate energy at the periphery of the cross section, and curing the composite material within the inner cavity with the

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second optical beam. This appears to anticipate applicant's claim 1. Said optical beams are transmitted sequentially through an optical waveguide.

Boutoussov et al teaches the hand-held device has an optical light guide which is mounted with an adaptor, said light guide may be configured to provide a curved light path and may comprise a few hundred fiber optic strands capable of providing image transfer quality. Said adaptor snaps into and out of the device thus the device can be used with various waveguides or optics of different configurations and functionalities—see page 6, lines 10-17. These teachings appear to anticipate claims 10-11. Said hand-held device may optionally include an optical mask for controlling the pattern of optical radiation emitted by the device—see Figure 1A, 142 and 144 and pages 6, lines 15-17 and pages 12-13, lines 25 to line 7 of page 13. This appears to anticipate claims 2-7. The hand held device includes a light source, which can comprise an array of diode elements comprised of light emitting diodes (LED) or laser diodes. This appears to anticipate claims 12 and 14. The array that forms said light source is connected to the power source is connected to an on/off switch or an AC power supply. This appears to anticipate the method of claims 13, 19, 21.

3. Claim 25 is rejected under 35 U.S.C. 102(b) as being anticipated by Crawford et al (5,726,730).

Crawford teaches mask for irradiating photopolymer films in selected areas. The polymer film is divided into two types of areas "core" areas and "cladding" areas. Said mask is divided into transparent core irradiation areas and opaque cladding non-irradiating area. The UV light will pass through the core irradiation areas of the mask and strike the photopolymer film in the "core" areas. Once the "core" areas have been irradiated, then the polymer film will with irradiated through a second mask, wherein the second mask is divided into transparent cladding irradiated areas and opaque core non-irradiated area, thusly irradiating only the "cladding" areas. This anticipates claim 25.

4. Claims 17-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Puvilland (5,110,513).

Puvilland teaches processes for photopolymerization of dental resins and composites made thereof. Said processes comprises filling a tooth cavity with a composite composition that composes of a main volume photopolymerizable material (first composition), which is curable at a first wavelength, and complementary volume photopolymerizable material, which is curable at a second wavelength. Said curing of takes place when said composite material is exposed to laser radiation, first at the first wavelength to cure the main volume and then second at the second wavelength to cure the complementary volume. Said, laser radiation is supplied by a monochromic

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argon laser that is tuned successively to a first wavelength (514 nm) and then a second wavelength (488 nm).

Puvilland teaches that curing the main volume first while the complementary volume is still in an unpolymerized state automatically compensates for the shrinkage of the main volume, because the fluidity of the complementary volume is sufficient for the complementary volume material to follow the movement of the surface of the cured main volume material during shrinking and to fill any cavity produced by said shrinkage. In addition, it is taught the shrinkage of the complementary volume is of very low absolute value, since the entire complementary volume is small. Therefore, the complementary volume material provides for shrinkage control of the entire composite and adds adhesive bonding of the entire composite and the cavity wall. Puvilland teaches this method results in both perfect bonding between the filling composite and the cavity walls and causes substantially zero stresses in the tooth, the filling component, and at the interface of the two. This process appears to anticipate claims 17-23.

5. Claims 15-16 and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Ostler et al (6,008,264).

Ostler et al teaches methods of curing polymeric materials through the use of light source power modulation. Said method utilizes a light power source on an intermittent or sporadic basis so that a single light power source may serially provide power to several physically discrete quantum's of dental materials to be cured. In one embodiment, Ostler et al teaches applying light to a dental material in a periodic fashion such as on/off so that while a first dental material is experiencing the off-phase of its cure, the light power source may be used to provide light and power to the on-phase of a second dental material. Said light source modulation is employed to initiate and control the growth of polymer chains in the dental material, so that the cured dental material has resulting polymer chains of a desired length; wherein the resultant material has the desired strength, hardness, lack of brittleness and other properties desired in dental materials. In addition, Ostler teaches minimizing shrinkage of the dental materials using power modulation. It is taught that use of multiple light sources or the ability to change wavelengths one or more times during the curing is useful in the methods taught by Ostler et al. This appears to anticipate applicant's claims 15-16. Examples of sources include multi-wavelength lasers and mixes combinations of different lasers. The wavelengths of the multi-wavelength lasers can be separated using filters, prisms, diffraction gratings and/or PolyChromatic Acusto optic modulators. Said modulators are preferred because they are capable of separating individual wavelengths and recombining them in any percentages desired. These teachings appear to anticipate claims 20-22.

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6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 8-9 rejected under 35 U.S.C. 103(a) as being unpatentable over Boutoussov et al in view of Lubbers et al.

Boutoussov et al teaches optical sources and methods using said source. Said optical source can be in the form of a medical apparatus (hand held curing device) that includes an array of optical sources for curing dental composites with controlled shrinkage and reduced chances of secondary caries. Boutoussov et al teaches the hand held device has an optical light guide which is mounted with an adaptor, said light guide may be configured to provide a curved light path and may comprise a few hundred fiber optic strands capable of providing image transfer quality. Said adaptor snaps into and out of the device thus the device can be used with various waveguides or optics of different configurations and functionalities--see page 6, lines 10-17. These teachings appear to anticipate claims 10-11. Said hand-held device may optionally include an optical mask for controlling the pattern of optical radiation emitted by the device--see Figure 1A, 142 and 144 and pages 6, lines 15-17 and pages 12-13, lines 25 to line 7 of page 13. Wherein, said optical mask taught by Boutoussov et al produces annulus (ring-like) patterns of optical radiation.

Boutoussov et al does not expressly teach exposing a selected segment of the material to the light energy wherein said exposing comprises exposing a plurality of selected segments of the material to light energy. However, Boutoussov et al teaches said light device can be used with various waveguides, different functionalities and configurations of optics, and optional optical mask to control the different irradiation patterns.

Lubbers et al teaches light conductors. Said light conductor comprises the steps of placing a mask on to one end of the light conductor, having a first specific but random arranged areas which are translucent, whereas the remaining mask is opaque, illuminating the mask covered end with at least one illuminating device, separating the light carrying fibers from the non-light carrying fibers at the one end, and connecting the light carrying fibers, respectively the non-light carrying fibers into

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separate strands. Lubber et al teaches other possibilities such as that one or a plurality of illuminating devices are provided from which a light ray of substantially punctiform cross-section emanates with which the end face of the other light conductor may be scanned in a programmable manner, whereas it is possible to separate fibers arranged in a very complicated pattern from the other fibers.

Boutoussov et al and Lubber et al are analogous art because they are from the same field of endeavor that is the art of adapting light sources to produced predetermined patterns of light.

Therefore, it would have been obvious for one of ordinary skill in the art to adapt the light conductor as taught by Lubber et al in the hand held device of Boutoussov et al to produce an image quality radiation pattern in the curing of said dental composites taught by Boutoussov et al. The motivation would have been as taught by Boutoussov et al to create a cured composite material within a tooth cavity without producing any or reducing the microgaps between the tooth and composite material.

Conclusion

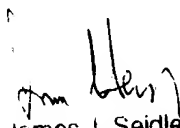
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sanza L McClendon whose telephone number is (703) 305-0505. The examiner can normally be reached on Monday through Friday 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (703) 308-2462. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0657.

Sanza L McClendon
Examiner
Art Unit 1711

SMc
July 5, 2002


James J. Seidleck
Supervisory Patent Examiner
Technology Center 1700